

ART XIV.—*A Clinical Treatise on Diseases of the Liver.* By Dr. FRIED. THEOD. FRERICHs, Professor of Clinical Medicine, formerly in the University of Breslau, and now in the University of Berlin, etc. etc. Translated by CHARLES MURCHISON, M. D., Fellow of the Royal College of Physicians, London, Assistant Physician to King's College Hospital, and to the London Fever Hospital. The New Sydenham Society, London, 1860. 2 vols. 8vo., pp. 402 and 584.

THE student of psychology, of the operation and results of our faculties when trying to find out how the Creator produces results in this material universe, will find a great deal of interest in the historical introduction to this clinical treatise on diseases of the liver. Seventeen hundred years ago, Galen gave a very complete account of the organization and functions of the liver, which was generally received and scarcely at all modified for fifteen hundred years. He regarded the liver as a blood-making organ, described the metamorphosis of the blood as commencing in the portal veins, and completed in the liver. The discovery of the lacteal vessels, in 1622, and of the thoracic duct, in 1647, of canals by which the assimilated juices contained in the digestive cavities could be conveyed to the blood-vessels and mixed with blood, seemed to place the liver out of the way of the process of sanguification. The function of the veins to take up the juices recently introduced into the economy or resulting from the disintegration of tissues, was transferred to lacteals and lymphatics. The portal vein carried blood from organs of digestion, which was purified by the excretion of the bile and then sent to the lungs. The liver was then regarded as an organ of excretion. Harvey's discoveries of the circulation of the blood confirmed these views, and those who tried to uphold the former views were but few and but little regarded. These opinions prevailed for nearly two hundred years. Our author quotes Boerhaave's observation, "*Dudum in meliori parte Europæ (obsolevit), hæc sanguificatio nunquam ab eo viscere expectanda.*" Magendie, Tiedemann, and Gmelin, physiologists of this century, proved that their immediate predecessors were mistaken, and that the ancients were right in regarding the liver as playing an important part in the manufacture of blood, and in the assimilation of matters taken into the digestive cavity. Galen's views, modified and circumscribed, were re-established. Blondlot, Claude Bernard, Lehmann, Schmidt, and Ludwig, have made the liver an especial object of experiment and study. They have proved that water, salts, sugar, odoriferous and colouring matters get to the blood through the veins, whilst the greatest part of the fat passes into the lacteals. Other observers, as Reichert, Weber, Kölliker, are trying to find out what is done by this organ to the corpuscles of the blood, what part is taken in manufacturing them. Bernard, feeding animals on nitrogenous food, found sugar in the hepatic veins, and attributes to the organ a function of sugar-making; and though by subsequent observers the work of the organ is regarded as ceasing with preparing a substance easily transformed into sugar, but more particularly destined for the manufacture of fat, yet the importance of the organ in secretion as well as in excretion is none the less established. That the complex atoms of the albuminous principles undergo other changes in the liver has also been shown, and Claude Bernard sustains Galen's views of the important work done by the organ in the manufacture of animal heat. In the last number

of this journal for the last year, there were published most important experimental researches into a "new excretory function of the liver," in which the office of the organ in purifying the blood is more clearly defined, and the bile is shown to be a compound fluid containing cholesterine taken up out of the blood where its presence is injurious, as well as recrementitious salts, the glycocholate and taurocholate of soda, which are manufactured by the liver itself, and are concerned in processes of assimilation. Thus are the functions of the liver being ascertained and defined. The idea of the organ being concerned in assimilation and nutrition, dates back to the days of Hippocrates and Galen, and yet within this last year, Dr. Austin Flint, Jr., has made important contributions to the establishment of these views. His two propositions are: "First, that the bile contains the glycocholate and taurocholate of soda, which are not found in the blood; are manufactured in the liver; are discharged mainly at a certain stage of the digestive process; are destined to assist in some of the nutritive processes; are not discharged from the body, and, in fine, are products of secretion; and, secondly, that the bile also contains cholesterine, which is found in the blood; is merely separated from it by the liver, and not manufactured in this organ; is not destined to assist in any of the nutritive processes, but merely represented to be discharged from the body, and is a product of excretion." Thus do we surmise and conjecture at truth; thus is it mixed up with errors, and so slow is the process of proving, settling, and separating. Dr. Flint tells us that the physiological history of the bile remains to be written. Is it not noticeable that so large and so important an organ of the body should be so imperfectly known and described, when it has been the object of study and research for so many hundred years?

Now, this fact, that the anatomy and physiology of the liver are still so imperfectly known, must be borne in mind when we examine a clinical treatise on diseases of the organ. Pathology is dependent on anatomy and physiology, and advances *pari passu* with the other sciences. In a clinical treatise we look for sound pathological views, as well as for a record of details observed at the bedside and in the autopsy room. The anatomy of the liver is more complete and better defined than the physiology. Its vessels, its cells, its connective tissue have been carefully studied by the aid of the microscope, and accurately described. But, whilst we recognize that the organ has an important part in secretion, excretion, sanguification, metamorphosis of tissue, production of animal heat, exactly what that part is, and how much it is, remain yet to be determined. The symptomatology of the organ must then be imperfect. The digestion, the nutrition of a patient is impaired, excretion is imperfectly performed, but we cannot yet say which of the various organs concerned in these processes is in fault primarily or principally. Pathological anatomy tells us of exudation of lymph, blood, and pus in the organ, it describes results of inflammation, it shows the exudation of cancer and tubercle, it tells of fatty and pigmentary degeneration, of hypertrophy and of atrophy, but the symptomatology, etiology, and therapeutics, in connection with these various lesions, are very obscure, uncertain, and imperfect.

A scientific work on the pathology of the liver is an impossibility in the present state of our knowledge. We must be very thankful for the clinical treatise of Dr. Frerichs, for which he claims that scientific medicine constitutes its groundwork. He tells us also that in the plan of his work he has had anatomy and physiology less in view than medical practice. The more important diseases of the liver are treated of in the second volume; those which

would first be considered had we the means of making a truly scientific treatise. There was an interval of two years between the publication of the first and that of the second volume. The first chapter of the first volume is occupied with a historical introduction; in the second chapter we have the size and weight of the organ in health and disease, whilst in the following chapter the diagnostic value of abnormal sizes and forms of the liver is ably discussed. There is a great deal of interesting matter in these two chapters, but we will proceed to the next, where, in a hundred and twenty octavo pages, the subject of jaundice is brought before us in several sections, the first of which is devoted to a historical account, and the second to the theory of the affection. The yellow tinging of the skin, and of several of the secretions by bile pigment, is the only attempt we find at a definition of the term. Of the sixteen ingredients which chemists find in the bile, biliverdine or colouring matter is the most recognizable to the unaided sight. We may admit that it is manufactured by the liver out of the colouring matter of the blood; and that, when this work is not done by the liver, the skin, the conjunctiva, and the renal secretions become the recipients of the pigment. But whilst this colouring matter is the most easily recognized ingredient of the bile, it does not compose that fluid, nor can we regard it as the most important ingredient. We must admit that in some cases other functions of the organ are performed, when the skin is yellow, and, that in other cases, with a skin, a conjunctiva, and a renal secretion of the normal colour, we have reason to believe that the patient is suffering from failure of the liver to perform the office of secretion and sanguification. Dr. Flint's researches come to our aid here, and we miss in Dr. Frerichs' treatise that distinct recognition of the different ingredients of the bile as both a recrementitious and excrementitious fluid, so clearly set forth by Dr. Flint in his admirable paper. Thus, we read in his treatise, that

"Jaundice from reabsorption forms the sure starting-point for further pathological inquiry, and in all cases and forms of the affection where it is practicable, the main question is to search for mechanical obstructions preventing the escape of the bile, or for other causes of the passage of this fluid into the blood. It is only when this is impossible that we can consider other theories of which a positive confirmation has hitherto been impossible, and the main value of which consists in the necessity for some hypothesis for explaining our observations. In such cases can we ascribe the jaundice to an accumulation of bile in the blood owing to something which interferes with its secretion, or are we to adopt the theory of a direct crumbling down of the blood-corpuscles or red matter of the blood into bile pigment?

"The production of jaundice from an imperfection in the secreting functions of the liver, which Budd and Bamberger have spoken of in recent times, without, however, bringing forward any striking proofs of the assertion, is opposed by too many well-established facts for us to support it. All the means for detecting traces of the essential elements of the bile in the blood generally, and in that of the portal vein in particular, have been exhausted without any result; neither the colouring matter, nor the acids of the bile, substances for which we possess tests of considerable delicacy, have been found.

"In the same way that urea accumulates in large quantities in the blood in granular degeneration of the kidneys, so ought the biliary acids and bile pigment to accumulate in the blood in cases of granular liver."

Now, Dr. Flint maintains, and, as we think, successfully, that cholesterine is the ingredient of the bile corresponding to the urea of the urine. This pre-exists in the blood, is derived from the disintegration of nervous tissue. The glycocholate and taurocholate of soda are manufactured by the liver, do not pre-exist in the blood, are never found in it under any

circumstances. They subserve for assimilation, and, when they are not secreted, assimilation will be defective. But when cholesterine is not excreted then poisonous matter accumulates in the blood, as urea accumulates with suppression of urine; and, whilst a certain amount of these substances in the blood is consistent with health, a greater amount is pernicious, and a still greater amount deadly. Now neither is cholesterine nor are the salts of the bile identical with its colouring matter, any more than urea is identical with the colouring matter of the urine. And we do not yet understand the relations they sustain to each other. In some cases of jaundice we do not detect symptoms of a deficiency in the secretion or the excretion of the liver. The assimilation is not defective, there is no evidence of cholesteræmia; whilst, in other cases, digestion is imperfect and the nervous system is oppressed by a poison. Nor can we distinctly connect the different anatomical conditions of the liver with a failure in its functions.

Dr. Frerichs has done well in taking up jaundice at the outset of his researches, because our knowledge of the organ is so imperfect. There are certain lesions, obstructions of the bile ducts, which interfere with the bile being discharged into the intestinal cavity, containing the assimilative juices and the seat of digestion, as well as a canal with a capacious outlet from which refuse, superfluous and poisonous matter escapes from the body. In these cases the cells and canals of the liver may hold for a while the excretion, or it may be absorbed into the body and removed by the skin, the kidneys and other excreting organs. We find cholesterine in the blood, brain, nerves, crystalline lens, meconium, in the fluid of hydrocele, and of ovarian cysts, in crude tubercle, in cancer, in epithelial tumours, in pus as well as in the bile and in the liver. The passage of this substance from the liver into the intestinal canal may be prevented for some little time, and nature can dispose of it in other ways, life being continued. Still, these arrangements are but temporary and incomplete; the patient suffers and finally dies. But the patient also suffers and dies where there is no obstruction to the ducts. The liver must be properly supplied with blood of the right kind and with nervous power to perform its functions of secretion, excretion, sanguification and assimilation. We have jaundice from pyæmia, from typhus, from yellow fever, from bilious fevers; we have epidemic jaundice. The word itself, so much associated with the presence of the colouring matter in the skin, expressive of and leading to a consideration of the failure of the liver to perform only one of its many functions, is unfortunate.

Dr. Frerichs' fifth chapter is on acholia, suppression of the functions of the liver, but has he a right to use these terms as synonymous? The secretion of the bile is one function of the liver, and if we distinguish this fluid as both excrementitious and secrementitious, as subservient to processes of assimilation of the food as well as to purification of the blood, and if we ascertain and recognize exactly how in the formation of this fluid the liver's share in sanguification, in animal heat is performed, then we may find that acholia, a non-secretion of bile, is identical with a suppression of the functions of the liver. We certainly seem now to be in the way of analyzing these complicated functions. There are many physiologists engaged in this study, and many pathologists are recording and analyzing cases where structural changes in the liver were found after death. In Dr. Frerichs' article on jaundice from snake-bites, he mentions the theory of older physicians, that this form of jaundice is owing to a spasm of the bile ducts, and he refers to that of Fontana, a liquefaction of the bile resulting from putrid decomposition, neither of

which are supported by recent observation. He calls attention to Bernard's experiments on the action of curare, which gives rise to congestion of the liver and to the excretion of sugar in the urine. And it must be in the same way that the poison of yellow fever gives rise to jaundice, acting on the nervous system, which presides over the circulation, and thus interfering with secretion and excretion. A change of colour of the organ, a fatty condition, have been noted by pathological anatomists; we may admit hyperæmia to have been present, but we have no evidences of nor can we believe in important modifications of structure as occurring in so short a disease. How far, then, is the fatal result to be attributed to what Dr. Flint calls cholesteræmia, to the non-performance by the liver of its function of excretion? The black vomit in this disease is now attributed to uræmia. The circulation in the kidneys is disturbed, they do not remove the uræa from the blood, the glandular system of the stomach undertakes this office, but, so great is the congestion, that the distended vessels relieve themselves of their contents, blood is poured into the digestive canal, mixed with its juices, and then is vomited. Suppression of urine is given as a most unfavourable symptom in this disease. Thus we seem to know more of the effect of the poison of yellow fever in interfering with the renal than with the hepatic function, whilst in the description of its lesions, the condition of the liver is more conspicuous than that of the kidney. And we need information of the effect of other poisons. Jaundice is a symptom of relapsing fever, given as a diagnostic symptom, and yet we sometimes have a yellow skin in typhus and typhoid fevers. This question may be asked, how far are those symptoms called typhous, nervous prostration, weakness, unconsciousness, to be attributed to the liver ceasing to excrete; or how far from the poison acting directly on the nervous centres of circulation and nutrition? Cholesterine seems to result from the disintegration of nerve-substance, connected with an active function; and we want a quantitative analysis of the blood and feces in patients dying in a typhous condition, to aid in the answer to these questions. Dr. Flint does not find cholesterine in feces. It becomes changed into stercorine, which, like cholesterine, is a non-saponifiable fat. Ten and a half grains were found in seven and a half ounces of feces, the dejection of a healthy male; but, this quantity varies, and we do not yet know the correspondence between the amount of cholesterine in the blood and of stercorine in the feces. Dr. Flint gives the following table to show the correspondence in the amount of cholesterine contained in the bile and the amount of stercorine discharged in the feces:—

Quantity of bile in the 24 hours . . . .	16.940 grains.
“ cholesterine at 0.618 pts. per 1000 . . . .	10.469
“ stercorine discharged . . . .	10.417

The difference here between the amount of cholesterine and of stercorine is only a little more than five per cent. of a grain. Now, we want more analyses of this kind, as well as analyses of the blood for cholesterine in patients with these different fevers, and in different forms of these fevers. Cholesterine instead of stercorine should be expected in the feces of patients where digestion is suspended, as the change from one substance to the other seems to be connected with the performance of this function. In hybernation the feces contain cholesterine and little or no stercorine.

We have dwelt on these researches of Dr. Flint to show how much light is thus thrown upon those cases where the liver does not perform its functions as an excreting organ, since the publication of Dr. Frerichs' work.

He did not distinguish between the excretion and secretion of the bile; he looks too much to the presence or absence of the colouring matter of this fluid in other parts, as the evidence that the liver is or is not performing its various functions. Still, his remarks may be read with interest and profit, and he has collected what was known, and has recorded observations of his own in such a way as to constitute an important advance in pathology.

His article on acholia is followed by and connected with those on acute and chronic atrophy of the liver. Here we have a most efficient and intelligible cause of jaundice. If the nutrition of an organ fails, if its secreting and excreting cells disappear, its functions must cease. Five cases are recorded in which atrophy of the liver was found after death, and these are called illustrative cases; and then follows an analysis of symptoms made from thirty-one cases, the only ones to be found which could be considered reliable and regarded as cases of acute atrophy. The account thus made out is not very satisfactory, but the fault is not so much with Dr. Frerichs, as with the insufficient means at his disposal. In these cases other organs were diseased. Atrophy is a general disease, and when one organ or tissue is conspicuously its seat, others are generally affected by it. So we get symptoms from the failure of several organs to discharge their functions, and we cannot yet assign to each its part in the symptoms. Thus we are told of premonitory symptoms in half of the cases consisting of those derangements which

"are met with in acute catarrh of the stomach and bowels, occasionally of rheumatic affections; upon these symptoms jaundice supervened, which in its characters was in no way distinguishable from simple jaundice. In most cases the duration of these premonitory symptoms amounted to from three to five days, but in many cases to from two to three weeks and upwards."

Certainly, in these symptoms there is nothing diagnostic. The skin was invariably jaundiced, its temperature elevated only during the premonitory febrile stage, and afterwards for a short period in the stage of great nervous excitement. It is the seat of hemorrhages, as are various parts of the body.

"The heart's action presents great variations, and in connection only with oscillations in the heart's action, are there abnormal respiratory motions, and does the breathing become sighing or stertorous."

The organs of digestion always undergo important functional changes, abdominal pains being among the most important symptoms; changes in the volume of the liver and spleen, and repeated vomiting, obstinate constipation being also noticeable.

"There are remarkable variations in the composition of the urine, indicating the existence of deeply important, although long unrecognized abnormal states of the metamorphosis of matter, and they furnish (provided further observations shall, as I have no doubt, show them to be of constant occurrence) no small insight into the transformations which take place in the albuminous principles in cases where the functions of the liver are arrested."

Here we may ask, are these symptoms from the kidneys due to a deficiency in their nutrition from the assimilating functions of the liver being suspended, or from the causes of disease of the liver acting on the kidneys and interfering with the functions of these organs? Abnormal conditions of the nervous system have been observed in every case as essential and characteristic symptoms. Thus the especial dependence of the nervous system on the liver is clearly manifested. From whatever cause its functions are interfered with, the nervous system suffers. A healthy blood is neces-

sary to the proper performance of its functions. If the kidneys do not excrete the urea we have headache, convulsions, coma, and other symptoms; and, if the liver does not perform its functions we may have the same symptoms. Can we distinguish between failures of these two organs by variations in these symptoms. In many cases they coexist. The causes which affect assimilation, as the poisons giving rise to the various fevers, act on both organs. Do not the causes which affect nutrition sometimes act on both, and under what circumstances is their influence limited to one? We do not find an answer to this question. We speak of Bright's disease of the kidney. We mean by this term modifications of circulation (that is, if we consider albuminous urine and dropsy, as diagnostic symptoms of the disease) as well as atrophy, granular degeneration, fatty degeneration, and the exudations of inflammation. Now we have no such one term for disease of the liver, embracing such diverse anatomical conditions of that organ. Dr. Frerichs begins with atrophy of the liver, and then goes on with fatty degeneration, pigmentary degeneration, cirrhosis, hyperæmia, and inflammation. But may not atrophy be a result of inflammation, or of fatty, or of fibrous degeneration? In these cases of acute atrophy he speaks of the glandular epithelium of the kidneys as being in most cases in a state of fatty degeneration, but he does not tell us whether in these same cases a similar degeneration had been found in the liver. There is an article on the nature of the disease, in which our author says that he hesitates to identify the destruction of the hepatic cells with fatty degeneration, whilst he is disposed to regard an exudation process as the starting point of the disease. Rokitansky, Hensch, Von Dusch refer the destruction of the hepatic cells to the action of the bile. Now, when the gall ducts are obstructed, distended, and pressure is made on the cells by retained excretion, a destructive agency is exerted, as in cases of retention of urine, when the secretory tissue of the kidneys disappears. But, an excess of elements of the bile formed in the blood of the portal vein, pervading the vascular apparatus of the liver and causing destruction of the glandular tissue by liquefaction, or an infiltration of the liver with bile from paralysis of bile ducts and lymphatic vessels, are simply theories, destitute of proof as is well shown by Frerichs.

In discussing the question, How are the symptoms which accompany the disease connected with the structural changes? our author again declares his belief of the harmlessness of the constituents of the bile, that is, in the slight importance of the excrementitious function of the liver. He dwells particularly on the

"cessation of the powerful influence which the liver exerts over the processes of metamorphosis of matter, and alludes to the formation of sugar out of albuminous substances, as a necessary link in the functional processes of the gland, and he infers from the existence of numerous other substances which have been observed, partly under normal, and partly under pathological conditions, such substances as xanthine, urea, inosine, leucine, tyrosine, cystine, that the organ is intimately related in many ways to the metamorphosis of matter."

He thus continues the discussion:—

"The important nature of these relations is shown by the remarkable changes which the urine—the general recipient of the chief ultimate products of this metamorphosis—undergoes in acute atrophy of the liver. The urea, which is the normal product of the disintegrated albuminous tissues, as we have seen, gradually disappears, and in its place a large quantity of products which are foreign to healthy urine, make their appearance. Its solid constituents consist almost exclusively of leucine and tyrosine, together with a peculiar extractive

matter; uric acid is present in tolerable quantity. It is doubtful what is the cause of the absence of urea. Is this substance really formed, although not excreted by the kidneys, or is the metamorphosis of tissue so far altered that at last no urea comes to be formed as an ultimate product? The considerable quantity of urea which is found in the blood, proves that its elimination is really stopped; still we must not conclude from this that the formation of the product takes place in a normal manner, because we have no idea, not even an approximate one, as regards the amount to which it accumulates in the blood. Thus far it must be regarded as an established fact, that acute atrophy of the liver induces very important abnormal conditions of the metamorphosis of matter, and that during its progress substances circulate in the blood which are not met with in that fluid in a healthy condition. What it is which induces the symptoms of blood poisoning is uncertain; that it is not leucine or tyrosine, is proved by injection of these substances into the blood of animals, producing no derangements of the nervous functions. It is more probable that they are due to a retention of the constituents of the urine, but this point cannot be determined without further investigation."

The reader can become convinced by a perusal of this passage, how our author, in following up one function of the liver, its part in the metamorphosis of tissue, loses sight of its excretion. The service rendered to science by Dr. Austin Flint, Jr., in his study of cholesterine, is as apparant.

Chronic atrophy of the liver is the subject of the sixth chapter; and the fatty liver that of the seventh. We are told that

"Deposits of fat in the tissue of the liver are amongst the most frequent structural changes observed in the organ. When this deposit attains to a high degree, we are wont to regard it as a disease, and to designate it by the name of fatty liver.

"All attempts to sketch an accurate history of this anatomical lesion, from clinical observations, have proved unsuccessful; fatty liver is met with so frequently on opening the dead body, and all clues to diagnosis during life are so inaccessible, that it is impossible to construct a satisfactory history of the affection. The remark, bearing upon this point, which Louis made, many years ago, in his *Recherches sur la Phthisie*, is, in many respects, still applicable: 'Nous manquons de signes capables de le faire connaître à une époque quelconque de sa durée. En vain j'ai été au devant des symptômes, qui pourraient lui appartenir, je n'en ai recueilli aucun.'

Our author sets before us the normal function of the liver in the production of fat, exemplified especially in invertebrate animals and in fish, and then studies the agency of diet to modify the amount of fat of the organ. He tells us that

"It is not merely food that is unusually rich in fat that gives rise to these deposits in the liver, but, under certain circumstances, every kind of food when in too great quantity has the same effect even when it is free from fat and only contains a large quantity of the carbohydrates. Here, however, the deposit does not make its appearance in the liver until the other organs and tissues are loaded with fat."

There is an interesting tabular view of the occurrence of fatty deposit in the liver, in different diseases, determined by microscopic examination, in which we find that the hepatic cells were rich in oil in 164 out of 466 bodies, whilst in one of sixteen bodies the fatty deposit pervaded the cells as far as the centre of the lobules. Tubercle of the lungs and the drunkard's dyscrasia are the pathological conditions in which fatty degeneration is most frequent; constitutional syphilis in eight cases was accompanied by a more or less fatty liver. It is very infrequent in caries, but was repeatedly observed in typhus, variola, and pyæmia, as well as in cirrhosis. It is noticeable that the smallest quantity of fat in the liver occurred in diabetes.



There are many interesting questions in connection with fatty liver brought before us in this treatise: What influence is exercised by the organ in the production or modification of fat; what is the pathological importance of fatty liver; what are the effects of the deposited fat upon the function of the liver and upon the entire system; what are the symptoms of fatty liver? None of these questions can be fully answered, but light is thrown upon all of them. A general conclusion is drawn

"That in every instance in which the blood becomes loaded with fat, either as a consequence of improper diet, or owing to abnormal conditions of the metamorphosis of matter, infiltration of the liver with fat may be developed either in transient or permanent form. There are two sets of glands, particularly, which become implicated by this altered condition of the blood, viz., the liver and the sebaceous glands of the skin. A greasy or velvety character of the cutis is thus a frequent accompaniment of fatty liver, and may, under certain circumstances, be of service in diagnosis."

Fatty infiltration is distinguished from fatty degeneration. This last is connected with atrophy, with imperfect nutrition, and here the liver is a sufferer in common with other organs. In the treatment of fatty liver we must regulate the diet, fat and alcoholic drinks to be avoided, and we must exhibit such drugs as may act to increase the secretion and the flow of the bile.

As the affection is found under different circumstances and in connection with several other diseases, no uniform plan can be laid down. We are told that the treatment must be mainly preventive and symptomatic.

The heading of the eighth chapter is "The Pigment Liver; Melanæmic Liver; Alterations in the Liver resulting from intermittent fevers." In the first article devoted to an historical account, we are reminded of the earliest theories of humoral pathology. In the discussions on its nature, origin, and effects, the origin of the pigment was supposed to be elsewhere, but a black viscid blood was said to be furnished to the liver to stagnate there, to become acrid, and, being distributed to other parts of the system, to give rise to most serious derangements, to fevers, convulsions, paralysis, and delirium. Towards the end of the last century Reid attacked these views. Heusinger attributed the morbid condition to a deposit of black pigment, and accounted for it by an exaggerated venous condition of the blood. Still, marsh fevers were regarded as atrabiliary fevers, and, then, when the causes of these fevers were shown to be from a poison in the atmosphere called malaria, the exact origin and composition of which is still unknown, the effects of that poison being principally on the spleen, and the agency of this organ as pigmentary, and in the red blood corpuscles being acknowledged, this whole subject was reviewed, and we are now trying to find out the seat, causes, and effect of what the ancients called atrabile. Black livers are found, and in the same cases black pigmentary deposits have been made in other organs. Bailly, in his account of the pernicious intermittents of Rome, dwells on the dark colour of the cortical substance of the brain. Bright speaks of a brain of the colour of black lead.

Now fever poison acts on the nervous system, presiding over the circulation of the blood, produces hyperæmia of the glands, and in this way at any rate acts on the blood. Enlargement, softening of the spleen, are anatomical characteristics of typhoid as well as of periodical fevers. Hyperæmia of the liver, modifications of its colour and size are especially associated with the last diseases, and are, to a certain extent, diagnostic of them. The mesenteric glands, Peyer's patches, undergo changes in typhoid fever. In disease of the supra-renal capsules, we find pigmentary degenerations,

as well as anæmia, which is so marked an effect of periodical fever. The colouring matter of the blood is modified, but by what organs? We must acknowledge several organs as concerned in blood making. The colouring matter of the urine and of the bile comes from the blood; then the kidneys and the liver have something to do with the colour of the blood. All admit now that disorder of the liver is not the only source of its black colour, but exactly what part the spleen acts in this process we do not know.

The article by Frerichs, containing an anatomical description of the pigment liver and of the co-existing conditions of the spleen, brain, kidneys and heart, is followed by one on the "Plan and Mode of Origin of Pigment," and by another on the "Results produced by the Formation of Pigment upon the Structure and Functions of the various Organs." There are thirteen observations in this chapter. In ten of these cases periodical fever was also present. In the article on etiology we are told that we do not know why this pigmentary degeneration, so associated with intermittent fever, is more frequently met with in certain epidemics. In the treatment, the cure of the periodical fever is spoken of as the first thing. To neutralize, to get rid of the poison is the first object. Our attention is called to its effects on the kidneys—

"Which become diseased in such a manner as to excite apprehension, sometimes at an early date, at other times not until a later period. Albuminuria and hematuria, which accompany the fever paroxysm, and remit and intermit along with it, yield best to quinine, and disappear, for the most part, so soon as the fever ceases."

The great danger in convalescence consisting in derangement of nutrition of the liver from its capillaries being loaded with pigment, and from the antecedent congestion conjoined with the alteration in the composition of the blood, produced by the poison, numerous capillaries being destroyed, and then a gradually increasing atrophy of the gland, which is not to be averted by any treatment known to Dr. Frerichs.

The ninth and last chapter of the first volume is on hyperæmia and its consequences. An account is given of the causes of the circulation in the liver, and of the modifying agencies of adjoining organs, and of the dependence of the circulation on nervous influences. Hemorrhage from the liver, with apoplexy and softening, are treated of in a sort of appendix. This chapter is a short one, and there is not room within our limits for very especial remark. Here, as elsewhere, we recognize how much is being done for, and how much is still wanting in our knowledge of the workings of this organ in health and disease. In tropical countries where its disorders prevail, practitioners and patients seem intimately acquainted with its functions, and the mode and causes of their interruption. The word bilious is in frequent use, and applied under various circumstances, and we are supposed to have several specifics for the relief and cure of those who are said to be in that condition. But when we ask of science a definition of this term, and an explanation of what is included in it, we must read a great deal, and then find out how much yet remains to be discovered. It is comparatively easy to guess at truth, but to get hold of it and put it into scientific formulæ is a most difficult matter.

The second volume of Dr. Frerichs' treatise opens with a chapter on inflammation of the liver. The author tells us that—

"By the term 'inflammation of the liver,' the ancient physicians designated certain groups of functional derangements, with the anatomical origin of which they were but imperfectly acquainted. Hence an indefinite idea was attached

to the term, which comprehended many diseases that did not properly belong to it. Of the earlier observations, those only can with certainty be relied on which proved to be really instances of inflammation, by terminating in the formation of abscess; cases of this nature were long ago described by Hippocrates, and his description was accompanied by some very apposite observations on diagnosis and prognosis. Galen distinguished between phlegmon and erysipelas of the liver, and, in addition to inflammation, described a hot and a cold 'intemperies.' Bianchi designated this intemperies by the term hepatitis, and made phlegmon and erysipelas of the liver distinct from it. In this way many writers fell into the error of making artificial subdivisions, for which no real foundations existed in nature. It was not until the 17th century, when pathological anatomy began to be studied, that a firm foundation was afforded for the clinical observation of these affections; but still, for a long period, physicians applied the term hepatitis to a group of symptoms which, in many instances, did not arise from inflammation of the liver; and, even at the present day, practitioners employ the term inflammation of the liver far more frequently than is warranted by the circumstances of the case."

In this account of a false symptomatology without a proper connection with anatomy and physiology, we recognize the advance made in medical science by the cultivation of pathological anatomy, and by the prevalence of a sounder philosophy, according to which, our powers of observation are employed to ascertain and describe the structure of different parts and organs, to watch them in operation, whilst faculties of arrangement and reasoning are subservient to place the various details in their proper relations. And yet our pathology is still so imperfect that great deficiencies, actual and relative, are at once apparent, when, from our foundation of anatomy and physiology, we try to build up the structure of symptomatology and therapeutics. The ancients failed signally in liver pathology from ignorance of anatomy and physiology; but when we would start with our greatly improved knowledge of structure and function, to give an account of one, and that a most important diseased process, of the inflammation of the organ, we find our progress slow, and we must admit that what we know is far less than what our predecessors of a thousand years ago confidently asserted and maintained. A chapter of one hundred and sixty-six pages is devoted by Mr. Frerichs to inflammation of the liver. His nosology is anatomical. Inflammation of the capsule of the liver, perihepatitis, is discussed in four pages. A comparison is sometimes instituted between our knowledge of the lungs and the liver. What author could undertake to tell all that is known of pleurisy in four octavo pages? We are told that these inflammatory processes are rarely accompanied by serious derangements, and it is only in exceptional cases that they lead to dangerous results. The causes are more frequently disease of the liver itself, or of adjacent parts or organs.

"The chief symptoms by which the disease may be recognized are the following. First, there is tenderness of the hepatic region upon pressure, upon motion, and upon deep inspiration, without any change in the volume or situation of the organ. Jaundice as a rule, is absent, or is slight, and of short duration. In addition, there are the symptoms of the primary disease, simple ulcer or cancer of the stomach, right pleurisy, &c. Febrile excitement of the vascular system is not unfrequently present. When the portal vein, the hepatic veins, or the bile ducts become implicated, the symptoms of disease of the vessels of the liver, or of chronic atrophy, or of obstruction of bile, manifest themselves."

The treatment is given in seven lines, in which bleeding, calomel, neutral salts, rigid diet, and rest are recommended.

Two forms of hepatitis are described, a diffuse inflammation, and a

circumscribed, followed by an abscess. Four cases of the first are given; the anatomical peculiarities are dwelt on at some little length, but no especial article is assigned to the symptoms or treatment, and we are referred to observations made in the first volume. What a difference between what is to be said of acute pneumonia and of acute hepatitis!

Chronic diffuse inflammation of the liver, to which the term cirrhosis is applied, occupies the next seventy-five pages. We have an historical account in which we are told of Morgagni and Baillie, as having recognized this state, at the same time confounding it with other lesions; and of Laennec as the first to apply the term; of the opinions of Bouillaud, and Andral, and Becquerel, whilst an accurate knowledge of the lesion was first obtained through the investigations of Kiernan, Hallmann, and Carswell. Allusion is made to the views of Rokitanski, Gubler, Budd, and Henock; and then there follows quite an elaborate anatomical description. We are reminded how infrequent are the opportunities of tracing the development of induration of the liver during life, or of examining, anatomically, the early stages of the lesion. Hence a difficulty of connecting symptoms with lesions, as well as of treating the successive stages of lesions. We recognize cirrhosis as a sequel of inflammation, hyperæmia, fibrinous exudation, hypertrophy of the connective tissue, as connected with atrophy of the secreting and circulating tissue. Pathologists are not agreed as to what should be called cirrhosis. Inflammation, hypertrophy of connective tissue, atrophy of secreting tissue are the leading features with Frerichs. He has also a separate article for simple induration of the liver, where granulations are not found at the autopsy, but

“Here a dense mass of areolar tissue becomes substituted for the parenchyma of the liver, from which, in many cases, every trace of the glandular tissue has disappeared over large spaces, whilst at other parts brown uniformly distributed dots of the remnants of the secreting cells can still be distinguished.”

A diagnosis during life between simple and granular induration is possible only when careful palpation can be practised. The symptoms of the two affections agree. Rokitansky speaks of two forms of cirrhosis, the one proceeding from a morbid development of the capillary bloodvessels, owing to an excessive secretion of bile, the other due to chronic inflammation of the parenchyma. Partial impermeability of the finest ramifications of the portal vein, resulting from inflammation and obliteration, or from lateral compression by the bile ducts, which are enlarged and loaded with fat; such are the anatomical features prominent with Oppolzer. Frerichs admits that the liver becomes granular in hyperæmia, from obstructed circulation in cardiac and pulmonary disease, but he does not agree with Becquerel in calling this cirrhosis, nor does he find disease of the heart and lungs frequent concomitant lesions. It seems to us that no one can say exactly what cirrhosis is anatomically. Inflammation and exudation, modifications of veins, arteries, and ducts are recognized by all authors who are not agreed as to the sequence, or relative prominence of these lesions. The name is anatomical, from appearances rather than from the nature of the lesion. Science has got beyond it, yet we cannot dispense with it. We still want histories of fibrous exudation, of fatty and amyloid degenerations of hypertrophy and atrophy. Attempts at all these are made, but with very partial success. We talk of drunkards' liver, of syphilitic liver. We recognize that also alcohol and syphilis are poisons determined to the liver, influencing its nutrition; but apparently with different effects in

different cases. Frerichs speaks of alcohol as the prominent cause in cirrhosis.

"Of 36 cases of cirrhosis which have come under my observation, twelve of the patients confessed to having been in the habit of drinking brandy in excess, and several of the others were suspected of the same vicious habit." "I have met with cirrhosis and delirium tremens far more frequently at Kiel, where strong spirits are frequently drunk in excess, than at Göttingen and Breslau, where the use of beer or wine is more common." "The rapid absorption of the spirits into the portal vein must give rise to irritation of the liver."

Now, all writers agree in making the liver the prominent organ to suffer in those addicted to the inordinate use of alcoholic drinks. But no explanation can be given. If alcohol does not undergo a change in the system, but is removed from it after it has acted in the venous system and passed through certain emunctories, we cannot suppose that the liver suffers in efforts to expel it. It is taken up by the veins, passed through the liver to the lungs, and thus gets out of the system. The lungs, the excretory organ, do not seem to suffer, but the liver is the seat of the mischief. New wines and beer containing starch and sugar, substances in the assimilation of which the liver has its function, do not as much mischief as malt spirits. This is Budd's observation, and Frerichs confirms it. Then we are told that—

"Whether there are other acrid ingesta, besides alcohol, which by being transmitted in the portal blood through the liver, can irritate this organ in such a manner as to give rise to chronic inflammation with subsequent induration, is a question which has not yet received a satisfactory answer. Budd is inclined to ascribe the frequent occurrence of cirrhosis, in India, to the excessive use of curry and other irritating spices, and there can be no doubt that these and similar substances, such as strong coffee, may excite transient hyperæmias of the liver."

The two prominent blood-making, assimilating, excreting glands—the liver and the lungs—are so related that we cannot take up any point in the pathology of the one without corresponding points in the history of the other occurring to the mind. Cold is said to be the principal cause of inflammation and degeneration of the lungs. Yet this cause is not applied directly to the organ. A healthy man, in active exercise on a cold day, draws cold air into his lungs with impunity. Another, breathing a warmer air, but with cool air applied to the skin, as in a damp, cool atmosphere in which the skin does not readily perform its excreting function, and in which its circulation is not free, has an attack of pneumonia, the exciting cause being a poison in the blood, something that the skin readily excretes, but which is removed by the lungs only with much irritation, with hyperæmia, exudation, and breaking down of tissue. There are atmospherical poisons, telluric poisons acting on the lungs. Bronchial typhus is a disease produced by an animal poison derived from without, an effect of contagion. Now we should expect poisons to be the principal causes of inflammation of the liver. The expression "taking cold," is not as often applied here as it is in affection of the lungs. The effete matter of the body which is still in the blood from defective circulation and excretion of the skin, does not seem to be determined to the liver, the diseases of which organ are most frequent in hot climates. But in these climates there are telluric and atmospherical poisons acting on the nervous system presiding over the circulation and secretion of the liver, and we hear of bilious fevers and of yellow fever. The organ suffers too in some way directly from overwork. Those going from England to India, and continuing the ingestion of alcoholic

drinks, which they had considered wholesome at home, suffer. Is this because the lungs, the excreting organs of alcohol, are less active, and hence alcohol stays longer in its passage through the liver, and has more chance to do mischief? There is less muscular exercise, the circulation is less active in these organs, they do not waste as fast, call less for the material of assimilation, and perhaps in this way the liver may suffer, being supplied with a blood from which the elaborated material has not been removed. The kidneys and the liver seem to be intimately connected. Both suffer from the poison of alcohol. We find bile pigment, leucine, and tyrosine in the urine, when the bile ducts are obstructed. In what way does the liver suffer when the kidneys are deficient? The fact that many causes interfere with the circulation and secretion of both the organs is a reason of our imperfect acquaintance with the symptoms of the diseases of each of them. We speak of syphilis as the cause of disease of the liver. This poison affects also the skin and the mucous membranes; it is in the blood. Like alcohol, it is generally a slow poison, and an opportunity of inspecting the internal organs is only afforded after many years of disease, and it is very seldom that the patient has been all the time under the observation of one practitioner. Our author describes three different forms of syphilitic hepatitis: the first, simple interstitial hepatitis and perihepatitis; the second, hepatitis gummosa; and the third, waxy, amyloid, or lardaceous degeneration.

The second chapter of the volume is devoted to this last affection, which was described by Stahl and Boerhaave, and referred to an accumulation of altered, thickened, or corrupted blood. To Rokitanski is given the credit of being the first to give a clear account of the essential character of this degeneration, and to recognize aright its pathogenetic relations to certain cachexiæ. Our author admits that investigations into the nature of this degeneration are not satisfactory. It is found in the spleen, lymphatic glands, kidneys, bloodvessels, mucous membranes, cartilage, and nerve tissue. It is found in connection with tubercle of the lungs and intestines, with caries and necrosis in scrofulous subjects. Malaria is one of its causes. But, here, in anatomy and etiology, we know more than in symptomatology. Other organs and tissues are so frequently affected, other diseases and disorders are so frequently found in connection with it, that the distinctive marks of the affection of the liver are not well ascertained. The secreting tissue, the apparatus for circulation, is sometimes more and sometimes less injured in the exudations of inflammations, in fatty and amyloid degeneration, and in cancer. When we have detected one of these degenerations as existing in the economy, then we may ask to what extent is the liver its seat. The illustrative cases of these diseases given by our author are well worth perusal, as well as his anatomical descriptions. Foundations are being laid, but the time has not yet come for valuable results in therapeutics. We are learning of the causes of these vicious diseases, and thus know how to advise those predisposed to them. But to detect them and recognize them positively, in their first stages, or to arrest the processes when well advanced, is not yet within our power. In his remarks on abscess of the liver, a limited and comparatively simple affection, our author admits that whilst

“In some cases there are definite symptoms directing attention to the seat of the disease from the beginning; these local symptoms are often so ill defined, or so obscured by others, the manifold varieties which they present are so difficult of analysis, essential symptoms and non-essential, are so easily confounded, that in a very large number of instances, the diagnosis does not rest upon that in-

fallible basis upon which we are enabled to build our conclusions in the case of diseases of other organs."

The third chapter, on hypertrophy, is a very short one. We are referred to the chapter on relative cases and forms, and we are told that—

"The question is still involved in much obscurity, and must be cleared up by subsequent investigation."

The fourth chapter is on pathological new formations, hepatic tumours, some of which are but of slight importance in medical practice, there being scarcely any constitutional symptoms, and their diagnosis being impossible. Hydatids are fully treated with interesting illustrations, and more than eighty pages are devoted to cancer. In one-fourth of the cases analyzed by our author, the disease was primary; and in three-fourths of the cases which were secondary, the site of the primary disease was on some organ of the portal system in two-thirds.

"No particular abnormal conditions are known to predispose to the development of cancer of the liver. The disease is met with in the anæmic as well as in the plethoric; in the badly fed as well as in those who live luxuriously. Neither spirituous liquors nor climate are predisposing causes, nor is it certain that any important influence can be attributed to hereditary transmission. The termination is always fatal; no one has succeeded in proving beyond doubt a single instance of cure. The treatment can only be directed against symptoms."

There is a short article on emphysema hepatis, in the concluding sentence of which we are told—

"Whether emphysema of the liver may, as Louis and Piorry believe that they have proved, exist during life, and be diagnosed from the disappearance of the hepatic dulness, can only be satisfactorily determined by further observations."

The fifth chapter is taken up with diseases of the bloodvessels. Congestion or hyperæmia was regarded as the cause of many symptoms attributed to a failure of the liver in performing its functions, and this congestion was supposed to be from disease of the vessels. But we now recognize the nervous system as paralyzed or unduly stimulated resulting in a failure of the circulation, and a subsequent failure of secretion. Frerichs speaks of the modern tendency to attribute all morbid processes to an anatomical origin being carried too far. He gives a list of twenty-seven authors who have written on obstruction of the portal vein and adhesive pylephlebitis; eight have written on calcification of the portal vein, six on rupture of the portal vein, and twenty-nine on purulent inflammation of the same vessel. He treats in separate articles diseases of the hepatic artery, of the portal vein, and of the hepatic veins. Many diseases or modifications of the arteries are in connection with or subsequent to diseases of the parenchyma, hypertrophy, atrophy, morbid growths. We are told that—

"The symptoms to which aneurism of the hepatic artery gives rise, are accordingly of a three-fold nature. In the first place, there is the tumour, which is sometimes remarkably large, and displaces the liver; secondly, there is the neuralgic pain produced by pressure upon the hepatic plexus of nerves; and, lastly, there is jaundice caused by compression of the bile ducts. The fatal termination, in most cases, takes place under symptoms of internal hemorrhage. It is very easy to mistake such a case for the colic arising from gall stones."

The diseases of the portal vein are enumerated by our author as coagula of blood and inflammation, thrombosis and pylephlebitis; obstruction. We are told that inflammation of the portal vein constitutes the starting-point in a comparatively small number of the cases where it is found. An analysis

of twenty-eight observations of obstruction of the portal vein in reference to the symptoms, has yielded the following results: ascites was absent in only three cases.

"In a man who died of very profuse hemorrhage from the stomach and bowels, I failed to observe either ascites or enlargement of the spleen, notwithstanding the complete occlusion of the trunk and branches of the portal vein. Here the hemorrhage compensated for the serous transudation which would, otherwise, have resulted from the obstruction. Diarrhœa was present in all but three cases, and in one-third of them the evacuations were bloody. In only four cases was there bloody vomiting."

Suppurative inflammation of the portal vein is especially interesting in reference to the metastatic abscesses which were once described as the effects of phlebitis. Our author regards it as almost invariably a consecutive lesion resulting from suppurative processes in the organs, in which the roots of the portal vein originate, or through which the vessel takes its course. Ulcerations of the intestinal canal and stomach constitute the most frequent starting-point of the disease, eight of twenty-five cases originating in this way. Ulceration of the cæcum and appendix vermiformis, in connection with the retention of hard fecal matter or with that of foreign bodies, is frequently a starting-point. Abscesses of the spleen sometimes give rise to suppurative pylephlebitis, and there are several cases on record associated with suppuration in the mesentery and mesenteric glands. Inflammatory irritation of the bile ducts may lead to ulceration and perforation not only of the wall of the bile ducts, but also of the vein.

"The most important data for diagnosis are the following: Pains in the epigastrium above the umbilicus or in the right hypochondrium, or in any of the other localities in which the inflammation has been shown to originate; attacks of rigors, occurring at regular intervals, and followed by profuse sweats; painful enlargement of the liver and spleen, accompanied by jaundice, bilious diarrhœa, and rapid emaciation; and lastly the typhoid symptoms of blood-poisoning, and the symptoms of general peritonitis."

Thus we see that repeated rigors, followed by heat and sweat, as in other cases of pyæmia, are prominent and characteristic symptoms. Of twenty-five cases, the formation of metastatic deposits in other parts of the body took place in only four, the portions of thrombus propelled into the circulation being arrested in the capillaries of the liver. The rapid loss of flesh and strength at an early period are also noticeable, as well as the delirium, somnolence, "the typhoid derangements of the nervous system" coming on later. In thrombus of the portal vein the violent fever with typhoid symptoms is wanting, and in place of peritonitis we find ascites. We are told also that treatment is powerless against suppurative inflammation of the portal vein, and that the disease always terminates in death, recovery being possible only when single branches of the vein are affected.

Adhesive and suppurative inflammation are likewise observed in the hepatic veins, but the diagnosis between obliteration of the hepatic veins and obstruction of the portal vein is impossible. The treatment must be regulated by the same principles as in adhesive pylephlebitis. Suppurative inflammation of the hepatic veins is more common, and is usually the result of hepatic abscesses. The hepatic veins, having no sheath, are more liable to these affections than the portal veins. Purulent phlebitis of the hepatic veins is more frequently accompanied by metastatic deposits in other organs than is the same affection of the portal veins.

Reference is again made to the dilatation of the capillary roots of the



hepatic veins coming on in the course of valvular disease of the heart, and attaining such a degree that the glandular cells in the centre of the lobules disappear, and there is a granular atrophy which our author cautions against confounding with cirrhosis. But we must not linger, and can only notice briefly the sixth and last chapter of the volume, devoted to diseases of the biliary passages.

Inflammation of the biliary passages is described as catarrhal and exudative. Our author tells us that these diseases of the biliary passages have not been sufficiently studied. Bronchitis, or inflammation of the excretory duct of the lung, is a well-known and frequent disease, of which cough and expectoration and rales are symptoms easily appreciated and recognized. The air, varying so much in temperature, and so frequently charged with foreign bodies, containing such different degrees of aqueous vapour, is a ready means of exciting diseased processes. Various poisons contained in the air disturb the circulation and secretion of the lining membrane of these ducts, as influenza and typhus, and their effects are soon detected. Death soon follows upon occlusion or marked obstruction of this duct, and we have opportunities of inspecting the parts after acute diseases and before other organs have undergone morbid alterations, the disorders of which would very much complicate the case. Three causes of catarrhal inflammation of the biliary passages are specified by our author, the most frequent of which is the existence of catarrh of the stomach and duodenum. He tells us that in forty-one cases, premonitory symptoms of gastro-enteric catarrh were discovered in thirty-four, and he seems to think that poisons contained in the atmosphere, as those which give rise to periodical and yellow fevers, act on the liver to disturb its functions by first inducing hyperæmia and inflammation of adjacent organs. Diseases of the parenchyma of the liver, hyperæmia, inflammation, degeneration, give rise to catarrh of the ducts. Now, in all these cases, symptoms from the disease and disorder of the stomach, duodenum, and parenchyma, are the early and prominent ones. The yellow skin and urine tell of the liver being affected, and these may be produced by an obstruction of the ducts from inflammation, thickening, exudation of the lining membrane, or from the secreting cells being acted on, their structure being modified, or the supply of blood or nerve-power failing them. We seem to have no symptoms purely referable to catarrh of the ducts. We explain in this way many cases of jaundice, because we infer that such may be the case, but we can hardly have direct proof that it is so. We do not find evidence of hepatitis, of cirrhosis, of cancer, or other hepatic degenerations, and the temporary and mild symptoms lead us to some state which can supervene and disappear in a short time. It is thus that diagnosis of catarrh of the bile ducts is often arrived at. The third cause of catarrh is the presence of foreign bodies, as concretions, worms, and these affections give rise to symptoms which overshadow those from catarrh. Bilious colic, the passage of a gall-stone, gives rise to catarrh, but it is marked by symptoms which engross the attention, and requires a treatment with but little reference to the catarrh.

The remedies used by our author in the treatment of catarrhal inflammation are rhubarb with carbonate of soda, aloes, colocynth, lemon-juice, bitartrate of potash, nitre, muriatic acid, and the mineral waters of Karlsbad, Marienbad, and Kissingen. Several vegetable extracts, as those of dandelion, celandine, and thistle, are also recommended.

Exudative inflammation of the gall-bladder and ducts, giving rise to pure fibrinous products or to purulent matter abounding in albumen, occurs

in the course of typhus and typhoid fevers, of cholera and pyæmia, as well as in cases of occlusion of the ducts by concretions in them, or by tumours pressing on them. A case from Andral is given where an error in diet was followed by duodenitis, the inflammation extending to the ductus choledochus, which was swollen so as to cause obstruction, its softened coats gave way under the pressure, and death supervened from peritonitis. In a case observed by our author, with the inflammation and ulceration of the mucous membrane of the biliary passages, there was an abscess in the liver of the size of a child's head, perforation of a smaller abscess and peritonitis. Pleurisy, pneumonia, bronchitis, were also present. Great debility, pains of head and abdomen, constipation, moderate cough, mucous expectoration, a moderate febrile movement, were the symptoms when the patient was first observed four weeks after giving up work, a decided rigor ushering in the symptoms; somnolence preceded death, a tinge of yellow was noticed in the skin first at the autopsy. Certainly in this case there were no definite symptoms of exudative inflammation of the biliary passages, and our author tells us we must not expect them until occlusion has taken place so as to interfere with the passage of bile. Our anatomical knowledge goes far before symptomatology here as elsewhere.

An article on constriction and occlusion of the biliary passages is followed by one on their dilatation, which is said to be almost without exception, the consequence of stricture. Dilatation of the gall-bladder is the subject of the next article, and a remarkable case communicated by Dr. Pepper, to this journal, is introduced. In the diagnosis of this affection we are told that

"every semi-globular or pear-shaped tumour that is felt at the margin of the liver must not at once be put down as an enlarged gall-bladder. Echinococci, abscesses of the liver, cancerous tumours of the liver and gall-bladder, may give rise to similar prominences."

Hydatid tumours may present the form of the gall-bladder, and soft medullary cancers sometimes grow from the lower margin of the gland.

In the article on morbid growths of the biliary passages, we are told that cancer may be primary, and that simple cancer of the gall-bladder is most frequent in old persons, commencing in the submucous tissue.

Foreign bodies in the biliary passages are the subject of the sixth article, the first three sections of which are devoted to entozoa, ascarides, hydatids, and distoma. Thirty-seven instances of round worms in the biliary passages are said to be all that are recorded in medical literature. In several of these cases death was attributable to their presence; colic and convulsions being prominent symptoms. Jaundice and white stools characterized other cases, whilst, sometimes, there were no symptoms referable to the liver.

The distomata are said to have their habitat in the biliary passages of the ruminantia, and are rarely found in the human body.

In the cases of the human subject the diagnosis of distomata could only be arrived at when they were ejected by vomiting or with the stools. Their etiology is still obscure. They probably enter the intestinal canal as cercariæ. In sheep jaundice rarely shows itself, and then only lasts a short time; a condition of anæmia being ultimately developed.

The subject of gall-stones occupies the last section in this article, and seventy octavo pages are devoted to it. First, we have an historical account, and, then the chemical and physical characters are given at some length. Mode of origin, disintegration, and etiology are successively brought forward. We are told that "cholesterine" is very rarely absent, and usually

forms the principal constituent of biliary concretions, colouring matter being found in all of them, but with few exceptions, there being several forms partly free and partly united with calcareous matter. Small quantities of biliary acids, in combination with a base, are found in most gall-stones, fatty acids and soaps, mucus and epithelium, oxides of iron, manganese, and copper, carbonates of lime and magnesia, earthy carbonates, phosphates and sulphates being other ingredients. The three parts of compound calculi, the nucleus, the shell, and the crust, are separately described; and then follows the article on their mode of origin. Stagnation and decomposition of bile constitute the primary cause of the formation, all the various ingredients of these concretions, except epithelium and mucus, being contained in a state of solution in normal bile. Still, our knowledge of the formation of these bodies is admitted to be very defective in many particulars.

"The diagnosis of gall-stones is easy or difficult, according to the severity of the derangements that they excite in the liver and its excretory apparatus."

We sometimes find gall-stones in the evacuations, when their existence has not been suspected, whilst the clinical features of hepatic colic cannot be confounded with those of any other affection.

But the practical question of treatment—how is that answered? Here too our knowledge is imperfect. We give one more extract, that our readers may have the views of our author on an important point, in his own words.

"The conditions under which a solution of a concretion is brought about, vary according to the nature of the external crust. Cholesterine and the compound of cholepyrrhin and lime, which are its most important constituents, and likewise, the mucus and cholate of lime may be dissolved by very alkaline bile; but this will produce no change upon a crust composed of carbonate of lime. Moreover, bile of a thin watery character may loosen the stones, dissolve their connective material, and so lead to their mechanical destruction or comminution. Hence the reason is intelligible why Hoffman's idea of employing alkalies in the treatment of gall-stones has again come to prevail, more particularly in the form of the alkaline mineral waters, which, as is shown by experience, produce a copious secretion of bile.

"These mineral waters" [of Karlsbad, Vichy, Ems, Marienbad, Eger] "have certainly proved the most efficacious remedies against gall-stones. In many cases I have directed my patients to go to Karlsbad, and have known them to return cured. In other cases I have known favourable results ensue under my own eyes, from drinking the water brought from the mill spring of Karlsbad, either cold or warm. French physicians speak in similar terms of Vichy water."

"The result, however, must not be mainly referred to the solvent power of these springs. The concretions are not dissolved to any great extent; most of them are voided unchanged under all the symptoms of hepatic colic; they are propelled by the current of the bile, the quantity of which is increased. It is a question for the medical men at Karlsbad and Vichy to determine more accurately than has hitherto been done, in what form gall-stones are voided under the use of those springs, whether unchanged, or eroded, or comminuted.

"If we have to choose from among the mineral waters above mentioned, Karlsbad and Vichy stand pre-eminent as the most efficacious; the former is to be preferred where there is not obstinate constipation. Ems is to be recommended to very irritable debilitated patients, suffering from a tendency to diarrhoea; Marienbad to plethoric patients with a disposition to congestions. The bicarbonate of soda, by itself, in combination with the sulphate of soda, is less efficacious than the mineral waters, being more apt to derange digestion, and ought to be given very diluted."

Bidder and Schmidt say that an increased ingestion of water is followed by an augmented secretion of thin bile, and Vanotti believes that he cured a case of gall-stones by the simple drinking of large quantities of water.

Hepatic neuralgia, independently of gall-stones, is believed in by our author, and an illustrative case given. In the appendix we have a description of gall-stones in twelve cases, and in a second article experiments on the excretion of hippuric acid by Dr. Neukomm.

We have thus endeavoured to give some account of the treatise by Dr. Frerichs. The importance of the subject and the fact of the work not having been republished in this country, are reasons for the extended notice. There are so many matters of interest in both volumes, so much that is still imperfectly explained and understood, that it has not been easy to confine ourselves to the present limits. There are ample opportunities in our country for studying these diseases, and they have not been neglected. We must go on in our efforts to ascertain more definitely how the liver performs its several functions. We hope that Dr. Flint will go on with his experiments and observations on its excreting office. Its functions in nutrition, in blood making, in the formation of sugar and fat, need to be more accurately defined and described, and we must still ask how does it contribute to sustain animal heat. It is certainly remarkable that an agent which has had a reputation for so long a time for powers of modifying and increasing the secretion of the organ, should now be on trial, and the question asked, after all has it any efficacy? Dr. Inman, of Liverpool, is maintaining that there is evidence that mercury does not increase the hepatic secretion, and Dr. Thudicum tells us of Dr. Mosler's proving that mercury does not make its appearance in the bile when given in the form of calomel, and of conclusions from several experiments, that the chances are six to one that calomel will diminish the quantity of bile secreted. "So move we on." Two hundred years ago the pathology of the liver was given with great assurance and certainty; its therapeutics were not doubted; but, now, a clinical treatise in two volumes, published successively in the course of two years, can only be regarded as a contribution, and views taken in it must be modified to meet researches which have been made and published since the work was undertaken. High praise should be awarded to it, and we shall look forward with interest to the subsequent researches of the author, as well as to those of others who without the means of, and incentives to exploration and study possessed by him, are living in countries and climates where the diseases and disorders of the organ are much more rife, and who thus have still greater opportunities of clinical observation.

Dr. Frerichs has given us a good clinical treatise on diseases of the liver. It must be carefully read by all who would have a distinct idea of what is and what is not known of the matters there treated, by all who would study the subject for themselves. Many of the questions arising in the mind of the practising physician are not satisfactorily answered even there; but ways are pointed out in which knowledge has been obtained, and in which more is to be had. We recognize how various are the functions of the organ, and we acknowledge how difficult it is of exploration, and how much less easily the fluid manufactured by it can be got hold of for analysis than that coming from the kidneys. Still, so much has been done in spite of all obstacles—so much skill, perseverance, and love of truth have been shown by various experimenters and observers, that we must be hopeful for the future, and believe that our present works on diseases of the liver will ere long be superseded, although they will not lose their place in the annals of science, and will be remembered as identified with stages in a continual progress towards a goal which is still far off, and may never be reached.

G. C. S.